



Zooplankton and Phytoplankton Activity 1

Grade Span	Middle School Physical Science
Time Span	5 class periods
Standards	<p>Obtaining, Evaluating, and Communicating Information Planning and Carrying Out in Investigation Analyzing and Interpreting Data</p> <ul style="list-style-type: none"> ● MS-LS1-6. Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms. ● MS-LS2-1 – Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. ● MS-LS2-2 – Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. ● MS-LS2-3 – Ecosystems: Interactions, Energy, and Dynamics. Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. ● MS-LS2-4 – Ecosystems: Interactions, Energy, and Dynamics. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
Focus Question	What organisms live at the bottom of our food chain and how does climate change affect them?
Overview	Students should understand that there are microscopic organisms living in water. These organisms get their energy from the sun. With the warming of the Earth's temperatures and human impacts there have been more algae blooms which affect these microscopic organisms.
Objectives	Students will be able to trace the energy flow through a marine ecosystem. Students will be able predict a link to algae blooms and the impact of climate change on living organisms in the water ecosystems.
Materials Needed	Watch the video on phytoplankton: The Secret Life Of Plankton Look over lessons: Harmful Algae Blooms



Vocabulary	<p>consumer, copepods, crustaceans, food chain, herbivore, invertebrate, larva, nutrients, photosynthesis, phytoplankton, plankton, producer, upwelling, zooplankton Limnology- the study of the biological, chemical, and physical features of lakes and other bodies of freshwater (according to Google Dictionary).</p>
Teacher Prep	<p>Link for making a phytoplankton net Aquatics Macroinvertebrates</p>
Background	<p>Zooplankton are the microscopic living animals in fresh and ocean waters. Phytoplankton are microscopic living plants that live in the fresh and ocean waters. They both use sunlight to survive. These organisms are at the bottom of our food chain and needed to keep nature in balance.</p>
Procedure	<p>Engage: Watch the video on phytoplankton: The Secret Life Of Plankton</p> <p>Explore: see lesson below Explanation: see lesson below</p> <p>Take lessons from Harmful Algae Blooms: http://uw.pressbooks.pub/climate/chapter/harmful-algal-blooms/</p> <p>There are 4 lessons in this activity:</p> <p>Lesson 1. Introduction to Phenomenon: Harmful Algal Blooms (HABs)</p> <p>Students create a conceptual diagram and then grow an algal bloom in the classroom.</p> <p>Lesson 2. Ecosystem Trophic Interactions</p> <p>Students play a game (Trace the Toxin) to explore trophic level interactions and trace the flow of energy throughout the marine environment.</p> <p>Lesson 3. HABs Case Studies and Links to Climate Change</p> <p>Students analyze real case studies to learn the environmental factors that cause algal blooms and evaluate the impact of climate change.</p> <p>Lesson 4. Plankton Identification, Scientific Drawing, and Conceptual Model Revision</p> <p>Students use microscopes to look at plankton and practice scientific drawing. Students conclude by revisiting and revising their conceptual models.</p> <p>Extension: see lessons above</p>



Wrap-Up	Evaluate: Formative Assessment: Exit Slips Summative:
Citations	<p><i>University of Washington Climate Science for the Classroom</i>. Pressbooks, uw.pressbooks.pub/climate/chapter/harmful-algal-blooms/. Accessed 7 July 2020.</p> <p>Created : 07/07/20 10:01AM</p> <p>Attribution: Mclachlan, R., Bolden, I., Boysen, A., Baker, C. "Harmful Algal Blooms" <i>Climate Science for the Classroom</i> edited by Bertram and Biyani, 2019. https://uw.pressbooks.pub/climate/chapter/harmful-algal-blooms/ Date of Access.</p>